



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,661	06/20/2006	Kazutoshi Okubo	06263/HG	2555
1933 7590 12/31/2009 FRISHAUF, HOLTZ, GOODMAN & CHICK, PC 220 Fifth Avenue 16TH Floor NEW YORK, NY 10001-7708				
EXAMINER NGUYEN, HUY TRAM				
ART UNIT		PAPER NUMBER		
1797				
MAIL DATE		DELIVERY MODE		
12/31/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



### Office Action Summary

**Application No.**

10/575,661

**Applicant(s)**

OKUBO ET AL.

**Examiner**

HUY-TRAM NGUYEN

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8, 12-14, 17, 18 and 26-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8, 26-29, 36-39 and 42 is/are allowed.
- 6) ☒ Claim(s) 12-14, 17, 18, 30-35 and 40-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Proficiency's Patent Drawing Review (PTO-544)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 8/28/09
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_



## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments, see Remarks, filed August 28, 2009, with respect to the rejection(s) of claim(s) 8, 12-14, 17-18, and 26-46 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of **Yoshimuta (JP-H5 ('93)-279043 A) in view of Ryota (JP-2000146993)**.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 14, 17, 30-31, and 44-46 are rejected under 35 U.S.C. 102(b) as being anticipated by **Yoshimuta (JP-H5 ('93)-279043 A)**.

Regarding Claim 14, Yoshimuta reference discloses a device for solidifying the surfaces of drops, comprising an ammonia gas sprayer with ammonia gas-spraying nozzles, each spraying ammonia gas to each of paths along which drops of the feedstock liquid that include uranyl nitrate fall to an aqueous ammonia solution stored in an aqueous ammonia solution reservoir, the drops being dripped from a dripping nozzle device wherein the dripping nozzle device comprises nozzles and the drops are dripped



from the nozzles, wherein the aqueous ammonia solution reservoir comprises an aqueous ammonia solution discharger for discharging the aqueous ammonia solution stored therein to keep constant the distance between the ends of the dripping nozzles and the surface of the aqueous ammonia solution, wherein the aqueous ammonia solution discharger has an overflow discharging hole in the circumferential sidewall **(Figure 1, numerals 1 – dripping nozzle, 7- ammonia atomizer, 19 - solution discharger and Paragraph [0033])**.

Regarding Claim 17, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 14, wherein the flow rates of the ammonia gas sprayed from the respective ammonia gas- spraying nozzles are adjustable **(Figure 1, numeral 7 and Paragraph [0027])**.

Regarding Claim 30, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 14, the dripping nozzle device further comprising a single vibrator for vibrating the nozzles simultaneously **(Paragraphs [0014], [0015], and [0025])**.

Regarding Claim 31, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 14, the dripping nozzle device further comprising a flow regulator and a volume of each of the drops for each nozzle, wherein the flow regulator has a flow regulator valve and a flowmeter **(Paragraph [0014])**.

Regarding Claim 44, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 14, wherein the ammonia gas sprayer is placed above the opening end of the aqueous ammonia solution reservoir at a location where



the sprayers do not block the opening end so that the path of the ammonia gas sprayed from each ammonia gas-spraying nozzle is perpendicular to the corresponding falling path of drops of the feedstock liquid dripped from the nozzles (**Figure 1, numeral 7**).

Regarding Claim 45, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 44, further comprising an ammonia gas discharger being placed opposite the ammonia gas sprayer with the falling path in between, wherein the discharger discharges the sprayed ammonia gas (**Figure 1, numeral 10**).

Regarding Claim 46, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 44, the aqueous ammonia solution reservoir further comprising an ammonia gas-supplying outlet for filling the reservoir with ammonia gas at a location above the surface of the aqueous ammonia solution on the sidewall of the aqueous ammonia solution reservoir (**Figure 1, numeral 5 - exhaust vent**).

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.



2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
7. Claim 13, 40-41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yoshimuta (JP-H5 ('93)-279043 A) in view of Ryota (JP-2000146993)**.

Regarding Claim 13, Yoshimuta reference discloses a device for supplying a feedstock liquid comprising the drops being dripped from a dripping nozzle device, wherein the dripping nozzle device comprises dripping nozzles and the drops are dripped from each of the dripping nozzles (**Figure 1, numeral 1 and Paragraph [0033]**).

However, Yoshimuta reference does not disclose a continuum irradiator and flow regulators for controlling an amount of the feedstock liquid to be supplied to each dripping nozzle from a feedstock liquid reservoir in which the feedstock liquid is stored, depending on conditions of the falling of the drops irradiated with the continuum light



irradiator; photosensors for sensing the light emitted by the continuum light irradiator and a controller for controlling the flow regulators upon an input of a sensing signal outputted by the photosensors so that the nozzles drip at the same dripping rate, the drops dripped from each nozzle have the same volume, and a drop dripped from one of the nozzles has the same volume as a drop dripped from any other one of the nozzles.

Ryota reference discloses an apparatus for detection of moving object using continuum light from an irradiated light source (**Abstract and Paragraph [0010]**) and photosensors for sensing the light emitted by the light irradiator; thus, controlling the flow regulators upon an input of a sensing signal outputted by the photosensors so that the nozzles drip at the same dripping rate, the drops dripped from each nozzle have the same volume, and a drop dripped from one of the nozzles has the same volume as a drop dripped from any other one of the nozzles (**Paragraph [0013] – photo detector**).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yoshimuta with the light irradiator as taught by Ryota, since Ryota states at **Abstract** that such a modification would detect the movement speed and volume of the moving object to find a relational expression which refers to the movement distance and the radius of the liquid drop.

Regarding Claim 40, Yoshimuta and Ryota references disclose the device for supplying a feedstock liquid according to claim 13, the dripping nozzle device further comprising a single vibrator for vibrating the nozzles simultaneously (**Yoshimuta - Paragraphs [0014], [0015], and [0025]**).



Regarding Claim 41, Yoshimuta and Ryota references disclose the device for supplying a feedstock liquid according to claim 13, the dripping nozzle device further comprising a feedstock liquid supplier for supplying the feedstock liquid to the nozzles substantially at a constant flow rate and with pulsation (**Yoshimuta – Paragraphs [0014] & [0033]**).

Regarding Claim 43, Yoshimuta and Ryota references disclose the device for supplying a feedstock liquid according to claim 13, wherein the controller converts the detection signals outputted by photosensors into positive pulse signals, and sends a drive-control signal to the corresponding flow regulator, when the pulse signals derived from the respective detection signals do not synchronize (**Paragraph [0013] - inherency**).

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Yoshimuta (JP-H5 ('93)-279043 A)**

Regarding Claim 18, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 14 except for the distance between the ends of the dripping nozzles and the ends of the ammonia gas spraying nozzles is from 10 mm to 40 mm, the shortest distance between the paths along which the drops dripped from the ends of the dripping nozzles fall and the ends of the ammonia gas spraying nozzles is from 3 mm to 15 mm, and the flow rate of the ammonia gas sprayed from the ammonia gas spraying nozzles is from 3 L/min to 25 L/min.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Yoshimuta with the claimed distance



between the ends of the dripping nozzles and the ends of the ammonia gas spraying nozzles and the claimed flow rate of the ammonia gas, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Claim 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yoshimuta (JP-H5 ('93)-279043 A) in view of Langen et al. (US Patent No. 4,224,258)**

Regarding Claim 32, Yoshimuta reference discloses the device for solidifying the surfaces of drops according to claim 30 except for, the dripping nozzle device further comprising a feedstock liquid container capable of containing a predetermined volume of the feedstock liquid supplied from a feedstock liquid reservoir in which the feedstock liquid is stored, the container having an inner volume larger than the inner volume of each of the dripping nozzles, wherein the container supplies the contained feedstock liquid to all the dripping nozzles by the force of gravity. Langen et al. reference discloses the claimed feedstock liquid container (**Figure 2, numeral 16**). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the dripping nozzle device as taught by Langen et al., since Langen et al. states at **Abstract** that such a modification would attain spherical drop shape with no deformation upon entering the aqueous solution of ammonia.

Regarding Claim 33, Yoshimuta and Langen et al. references disclose the device for solidifying the surfaces of drops according to claim 32, wherein the feedstock liquid



container has a horizontal section, the area of which is larger than the area of the horizontal section of each of the dripping nozzles (**Langen et al. - Figure 2, numeral 16**).

Regarding Claim 34, Yoshimuta and Langen et al. references disclose the device for solidifying the surfaces of drops according to claim 32, wherein the feedstock liquid container is directly connected to all the dripping nozzles (**Langen et al. - Figure 2, numeral 16 and Column 4, Lines 28-30**).

Regarding Claim 35, Yoshimuta and Langen et al. references disclose the device for solidifying the surfaces of drops according to claim 32, wherein the respective ends of all the dripping nozzles are provided with an edge thinned in the direction of the falling of the drops (**Figure 2, tip of the nozzle is thinner**).

***Allowable Subject Matter***

10. Claims 8, 26-27, 12, 28-29 and 36-39 are allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 8 and 36, the closest prior art, **Yoshimuta (JP-H5 ('93)-279043 A)** discloses the claimed device except for a remaining feedstock liquid collector placed between dripping nozzles and the aqueous ammonia solution for receiving a remainder of the feedstock liquid remaining in the feedstock liquid transferring passage when the dripping of the feedstock liquid is stopped and a feedstock liquid remainder transferring passage for transferring the remainder to the feedstock liquid reservoir.



**Langen et al. (US Patent No. 4,224,258)** discloses a dripping device comprising a diaphragm 7 and funnel 8 placing between a dripping nozzle and the aqueous ammonia solution for diverting the liquid emanating from the nozzle through the funnel 8 when the droplets are not sufficiently uniform (**Figure 1**). However, this structure is only used with the horizontal dripping nozzle. There is no suggestion/motivation for using this structure for the vertical dripping nozzle (**Langen et al. – Figure 2**).

Claims 26-27 directly or indirectly depend on Claims 1 and 36 respectively.

Regarding Claim 12, the closest prior art, , **Yoshimuta (JP-H5 ('93)-279043 A)** discloses the claimed device except for a light irradiator comprising a strobe light irradiator for emitting a light that **flashes on and off periodically** for irradiating with the strobe light irradiator drops of a feedstock liquid. Ryota (JP-2000-146993A) discloses an apparatus for detection of moving object using light from a continuum irradiated light source.

Claims 28-29 and 42 directly depend on Claim 12.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUY-TRAM NGUYEN whose telephone number is (571)270-3167. The examiner can normally be reached on MON- THURS: 6:30 AM - 5:00 PM.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HTN  
12/29/09

/Walter D. Griffin/  
Supervisory Patent Examiner, Art Unit 1797